

Appendix A - Clean version



#6

SEQUENCE LISTING

<110> Sera, Takashi

<120> Zinc Finger Domain Recognition Code and Uses Thereof

<130> 109845.135

<140> US 09/911,261

<141> 2001-07-23

<150> US 60/220,060

<151> 2000-07-21

<160> 69

<170> PatentIn version 3.0

<210> 1

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

a <223> Zinc finger domain

<220>

<221> MISC_FEATURE

<222> (1)..(32)

<223> Amino acids 1-3, 10-21 and 29-32 are Xaa wherein Xaa = any amino acid.

<220>

<221> VARIANT

<222> (5)..(8)

<223> Amino acids 5-8 are Xaa wherein Xaa = any amino acid, and up to two can be missing.

<220>

<221> VARIANT

<222> (23)..(27)

<223> Amino acids 23-27 are Xaa wherein Xaa = any amino acid, and up to two can be missing.

<400> 1

Xaa Xaa Xaa Cys Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa

1

5

10

15

Xaa Xaa Xaa Xaa Xaa His Xaa Xaa Xaa Xaa Xaa His Xaa Xaa Xaa Xaa
20 25 30

<210> 2

<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger domain

<220>
<221> MISC_FEATURE
<222> (1)..(32)
<223> Amino acids 1-3, 10-14, 16, 19, 20 and 29-32 are Xaa wherein Xaa = any amino acid.

<220>
<221> VARIANT
<222> (5)..(8)
<223> Amino acids 5-8 are Xaa wherein Xaa = any amino acid, and up to two can be missing.

<220>
<221> VARIANT
<222> (23)..(27)
<223> Amino acids 23-27 are Xaa wherein Xaa = any amino acid, and up to two can be missing.

<220>
<221> VARIANT
<222> (15)..(15)
<223> Amino acid 15 is Xaa wherein Xaa = Z-1 wherein Z-1 = Arg or Lys, Gln or Asn, Thr, Met, Leu or Ile, or Glu or Asp.

<220>
<221> VARIANT
<222> (17)..(17)
<223> Amino acid 17 is Xaa wherein Xaa = Z2 wherein Z2 = Ser or Arg, Asn, Gln, Thr, Val or Ala, or Asp or Glu.

<220>
<221> VARIANT
<222> (18)..(18)
<223> Amino acid 18 is Xaa wherein Xaa = Z3 wherein Z3 = His or Lys, Asn or Gln, Ser, Ala or Met, or Asp or Glu.

<220>
<221> VARIANT

<222> (21)..(21)

<223> Amino acid 21 is Xaa wherein Xaa = Z6 wherein Z6 = Arg or Lys, Gln or Asn, Thr, Tyr, Leu, Ile or Met, or Glu or Asp.

<400> 2

Xaa Xaa Xaa Cys Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa His Xaa Xaa Xaa Xaa His Xaa Xaa Xaa Xaa
20 25 30

<210> 3

<211> 196

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger protein

<400> 3

Val Pro Ile Pro Gly Lys Lys Gln His Ile Cys His Ile Gln Gly
1 5 10 15

Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg
20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
35 40 45

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
65 70 75 80

Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
85 90 95

Asp Gly Gly Ser Gly Lys Lys Gln His Ile Cys His Ile Gln
100 105 110

Gly Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu
115 120 125

Arg Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys
130 135 140

Gly Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr
145 150 155 160

His Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe
165 170 175

Met Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys
180 185 190

Lys Gly Gly Ser
195

<210> 4

<211> 99

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger protein

<400> 4

Val Pro Ile Pro Gly Lys Lys Gln His Ile Cys His Ile Gln Gly
1 5 10 15

Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu Arg
20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
35 40 45

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
65 70 75 80

Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
85 90 95

Gly Gly Ser

<210> 5

<211> 99

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger protein

<400> 5

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Gln Gln His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 6

<211> 99

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger protein

<400> 6

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Glu Ser Ser Asp Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 7
<211> 99
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger protein

<400> 7

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Gln Glu His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 8
<211> 99
<212> PRT
<213> Artificial Sequence
<220>
<223> Zinc finger protein
<400> 8

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 9
<211> 99
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger protein

<400> 9

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser Asn Leu Gln Glu His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 10
<211> 99
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger protein

<400> 10

Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asp Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

<210> 11
<211> 229
<212> PRT
<213> Human

<400> 11

Met Arg Leu Ala Lys Pro Lys Ala Gly Ile Ser Arg Ser Ser Ser Gln
1 5 10 15

Gly Lys Ala Tyr Glu Asn Lys Arg Lys Thr Gly Arg Gln Arg Glu Lys
20 25 30

Trp Gly Met Thr Ile Arg Phe Asp Ser Ser Phe Ser Arg Leu Arg Arg
35 40 45

Ser Leu Asp Asp Lys Pro Tyr Lys Cys Thr Glu Cys Glu Lys Ser Phe
50 55 60

Ser Gln Ser Ser Thr Leu Phe Gln His Gln Lys Ile His Thr Gly Lys
65 70 75 80

Lys Ser His Lys Cys Ala Asp Cys Gly Lys Ser Phe Phe Gln Ser Ser
85 90 95

Asn Leu Ile Gln His Arg Arg Ile His Thr Gly Glu Lys Pro Tyr Lys
100 105 110

Cys Asp Glu Cys Gly Glu Ser Phe Lys Gln Ser Ser Asn Leu Ile Gln
115 120 125

His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Gln Cys Asp Glu Cys
130 135 140

Gly Arg Cys Phe Ser Gln Ser Ser His Leu Ile Gln His Gln Arg Thr
145 150 155 160

His Thr Gly Glu Lys Pro Tyr Gln Cys Ser Glu Cys Gly Lys Cys Phe
165 170 175

Ser Gln Ser Ser His Leu Arg Gln His Met Lys Val His Lys Glu Glu
180 185 190

Lys Pro Arg Lys Thr Arg Gly Lys Asn Ile Arg Val Lys Thr His Leu
195 200 205

Pro Ser Trp Lys Ala Gly Thr Glu Gly Ser Leu Trp Leu Val Ser Val
210 215 220

Lys Tyr Arg Ala Phe
225

<210> 12
<211> 393
<212> PRT
<213> Mouse

<400> 12

Met Ser Glu Glu Pro Leu Glu Asn Ala Glu Lys Asn Pro Gly Ser Glu
1 5 10 15

Glu Ala Phe Glu Ser Gly Asp Gln Ala Glu Arg Pro Trp Gly Asp Leu
20 25 30

Thr Ala Glu Glu Trp Val Ser Tyr Pro Leu Gln Gln Val Thr Asp Leu
35 40 45

Leu	Val	His	Lys	Glü	Ala	His	Ala	Gly	Ile	Arg	Tyr	His	Ile	Cys	Ser
50				55						60					
Gln	Cys	Gly	Lys	Ala	Phe	Ser	Gln	Ile	Ser	Asp	Leu	Asn	Arg	His	Gln
65				70					75				80		
Lys	Thr	His	Thr	Gly	Asp	Arg	Pro	Tyr	Lys	Cys	Tyr	Glu	Cys	Gly	Lys
	85				90							95			
Gly	Phe	Ser	Arg	Ser	Ser	His	Leu	Ile	Gln	His	Gln	Arg	Thr	His	Thr
	100					105						110			
Gly	Glu	Arg	Pro	Tyr	Asp	Cys	Asn	Glu	Cys	Gly	Lys	Ser	Phe	Gly	Arg
	115					120						125			
Ser	Ser	His	Leu	Ile	Gln	His	Gln	Thr	Ile	His	Thr	Gly	Glu	Lys	Pro
	130				135							140			
His	Lys	Cys	Thr	Glu	Cys	Ala	Lys	Ala	Ser	Ala	Ala	Ser	Pro	His	Leu
145				150					155				160		
Ile	Gln	His	Gln	Arg	Thr	His	Ser	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Glu
	165				170							175			
Glu	Cys	Gly	Lys	Ser	Phe	Ser	Arg	Ser	Ser	His	Leu	Ala	Gln	His	Gln
	180				185							190			
Arg	Thr	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	His	Glu	Cys	Gly	Arg
	195				200							205			
Gly	Phe	Ser	Glu	Arg	Ser	Asp	Leu	Ile	Lys	His	Tyr	Arg	Val	His	Thr
	210				215							220			
Gly	Glu	Arg	Pro	Tyr	Lys	Cys	Asp	Glu	Cys	Gly	Lys	Asn	Phe	Ser	Gln
225					230				235				240		
Asn	Ser	Asp	Leu	Val	Arg	His	Arg	Arg	Ala	His	Thr	Gly	Glu	Lys	Pro
	245					250						255			
Tyr	His	Cys	Asn	Glu	Cys	Gly	Glu	Asn	Phe	Ser	Arg	Ile	Ser	His	Leu
	260					265						270			
Val	Gln	His	Gln	Arg	Thr	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Thr
	275					280						285			
Ala	Cys	Gly	Lys	Ser	Phe	Ser	Arg	Ser	Ser	His	Leu	Ile	Thr	His	Gln
	290				295							300			
Lys	Ile	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Asn	Glu	Cys	Trp	Arg
	305				310				315				320		

Ser Phe Gly Glu Arg Ser Asp Leu Ile Lys His Gln Arg Thr His Thr
325 330 335

Gly Glu Lys Pro Tyr Glu Cys Val Gln Cys Gly Lys Gly Phe Thr Gln
340 345 350

Ser Ser Asn Leu Ile Thr His Gln Arg Val His Thr Gly Glu Lys Pro
355 360 365

Tyr Glu Cys Thr Glu Cys Asp Lys Ser Phe Ser Arg Ser Ser Ala Leu
370 375 380

Ile Lys His Lys Arg Val His Thr Asp
385 390

<210> 13
<211> 28

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain.

<220>

<221> VARIANT

<222> (13)..(13)

<223> Amino acid 13 is Xaa wherein Xaa = Z-1 wherein Z-1 = Arg or Lys, Gln or Asn, Thr, Met, Leu or Ile, or Glu or Asp.

<220>

<221> VARIANT

<222> (15)..(15)

<223> Amino acid 15 is Xaa wherein Xaa = Z2 wherein Z2 = Ser or Arg, Asn or Gln, Thr, Met, or Ala, or Asp or Glu.

<220>

<221> VARIANT

<222> (16)..(16)

<223> Amino acid 16 is Xaa wherein Xaa = Z3 wherein Z3 = His or Lys, Asn or Gln, Ser, Ala, or Met, or Asp or Glu.

<220>

<221> VARIANT

<222> (19)..(19)

<223> Amino acid 19 is Xaa wherein Xaa = Z6 wherein Z6 = Arg or Lys, Gln or Asn, Thr, Tyr, Leu, Ile or Met, or Glu or Asp.

<400> 13

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa
1 5 10 15

Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 14
<211> 10

<212> DNA
<213> Tomato golden mosaic virus

<400> 14
agtaaggtag 10

<210> 15
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger domain.

<400> 15

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Asp Ser
1 5 10 15

Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 16
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger domain.

<400> 16

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Asn
1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 17
<211> 28

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain

<400> 17

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Thr Ser Thr His
1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 18

<211> 11

<212> PRT

<213> Human immunodeficiency virus

<400> 18

Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg
1 5 10

<210> 19

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> Acid dimerization peptide.

<400> 19

Ala Gln Leu Glu Lys Glu Leu Gln Ala Leu Glu Lys Glu Asn Ala Gln
1 5 10 15

Leu Glu Trp Glu Leu Gln Ala Leu Glu Lys Glu Leu Ala Gln
20 25 30

<210> 20

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> Basic dimerization peptide

<400> 20

Ala Gln Leu Lys Lys Lys Leu Gln Ala Leu Lys Lys Lys Asn Ala Gln
1 5 10 15

Leu Lys Trp Lys Leu Gln Ala Leu Lys Lys Lys Leu Ala Gln
20 25 30

<210> 21
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Flexible linker

<400> 21

Gly Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser
20

<210> 22
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Flexible linker

<400> 22
gcagaagcc

9

<210> 23
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Flexible linker

<400> 23

Gly Gly Gly Gly Ser
1 5

<210> 24
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> All target polynucleotide

<400> 24
tatataataag taaggttagta tatata

26

<210> 25
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Target polynucleotide for zinc finger protein Zif268

<400> 25
tatatatatagc gtgggcgtta tatata

26

<210> 26
<211> 26

<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 26
tatataataag taaggttagta tatata

26

<210> 27
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 27
tatataataag taaggtaata tatata

26

<210> 28
<211> 26
<212> DNA

<213> Artificial Sequence
<220>
<223> ZFP target sequence

<400> 28
tatataataag taaggtatta tatata

26

<210> 29
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 29
tatataataag taaggtacta tatata

26

<210> 30
<211> 84
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger protein

<220>
<221> VARIANT

<222> (15)..(15)
<223> Amino acid 15 is "Xaa" wherein "Xaa" = is any amino acid.

<400> 30

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Asp Ser Xaa Ala
1 5 10 15

Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys
20 25 30

Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu Gln Lys His
35 40 45

Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly
50 55 60

Lys Ser Phe Ser Arg Ser Asp His Leu Gln Arg His Gln Arg Thr His
65 70 75 80

Thr Gly Glu Lys

<210> 31
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Degenerate DNA probe

<220>
<221> misc_feature
<222> (7)..(10)
<223> Nucleotides 7-10 are "n" wherein "n" = g, a, t, or c.

<400> 31
ggggaaannnn

10

<210> 32
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Zinc finger domain target sequence

<220>
<221> misc_feature
<222> (14)..(16)
<223> Nucleotides 14-16 are "n" wherein "n" = g, a, t, or c.

<400> 32
tatatatagg ggaannngta tatata
26

<210> 33
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Zinc finger domain target sequence

<220>
<221> misc_feature
<222> (15)..(17)
<223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 33
tatatatagg ggaannata tatata

26

<210> 34
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Zinc finger domain target sequence

<220>
<221> misc_feature
<222> (15)..(17)
<223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 34
tatatatagg ggaannntta tatata

26

<210> 35
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Zinc finger domain target sequence

<220>
<221> misc_feature
<222> (15)..(17)
<223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 35
tatatatagg ggaannnta tatata

26

<210> 36
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature
<222> (45)..(56)

<223> Nucleotides 45-47 and 51-56 are "n" wherein "n" = g, a, t, or c.

<400> 36
ggggagaagc cgtataaatg tccggaatgt ggtaaaagtt ttagcnnnag cnnnnnnntg 60

<210> 37
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature
<222> (37)..(51)
<223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

<400> 37
tttgtatgg tttcacccgg tatgggtacg ctgatgnnc tgcaannnn ngctnnngct 60

<210> 38
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature
<222> (46)..(57)
<223> Nucleotides 46-48 and 52-57 are "n" wherein "n" = g, a, t, or c.

<400> 38
ggtaaaaaac catacaaatg tccagagtgc ggcaaatctt tctctnnntc tnnnnnnnctt 60

<210> 39
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature

<222> (37)..(51)
<223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

<400> 39
cttgtaaggc ttctcgccag tgtgagtagc ctgatgnnnc tgaagnnnn nagannnaga 60

<210> 40
<211> 56
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature
<222> (48)..(58)
<223> Nucleotides 48-50 and 54-58 are "n" wherein "n" = g, a, t, or c.

<400> 40
ggcgagaagc cttacaagtg ccctgaatgc ggaaagagct ttagtnnnag tnnnnn 56

<210> 41
<211> 55
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<220>
<221> misc_feature
<222> (28)..(48)
<223> Nucleotides 28-30, 37-42 and 46-48 are "n" wherein "n" = g, a, t, or c

<400> 41
cttctccccc gtgtcggtgc gttgggtgnnn ttgttaannnn nnactnnnac taaag 55

<210> 42
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 42
ggccccggtc tcgaattcgg ggagaagccg tataaatgtc cggaa 45

<210> 43
<211> 48

<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 43
cccgggggtc tcaagctttt acttctcccc cgtgtgcgtg cgttggtg 48

<210> 44
<211> 10
<212> DNA
<213> Beet curly top virus

<400> 44
ttgggtgctc 10

<210> 45
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 45
ggggagaagc cgtataaatg tccggaatgt ggtaaaagtt ttagcaccag cagcgatttg 60

<210> 46
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 46
tttgtatggt ttttacccgg tatgggtacg ctgatgacgc tgcaaatcgc tgctggcgt 60

<210> 47
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 47
ggtaaaaaac catacaaatg tccagagtgc ggcaaatctt tctctacctc tgatcatctt 60

<210> 48

<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 48
cttgtaaggc ttctcgccag tgtgagtacg ctgatgacgc tgaagatgat cagaggtaga 60

<210> 49
<211> 56
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 49
ggcgagaagc cttacaagtg ccctgaatgc ggaaagagct ttagtcgtag tgatag 56

<210> 50
<211> 55
<212> DNA
<213> Artificial Sequence

<220>
<223> Partial zinc finger domain oligomer

<400> 50
cttctccccc gtgtgcgtgc gttgggggt ttgtaagcta tcactacgac taaag 55

<210> 51
<211> 16
<212> DNA
<213> Arabidopsis

<400> 51
atagttacg tggcat 16

<210> 52
<211> 10
<212> DNA
<213> Arabidopsis

<400> 52
atagtttacg

10

<210> 53
<211> 10
<212> DNA
<213> Arabidopsis

<400> 53
tacgtggcat

10

<210> 54
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 54
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45

<210> 55
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> PCR primer

<400> 55
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44

<210> 56
<211> 45
<212> DNA
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<220>
<223> PCR primer

<400> 56
tgccggccggg tctctcggt tctcccccgt gtgcgtgcgt tggtg

45

<210> 57
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 57
ttgggtgctt tgggtgctc

19

<210> 58
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 58
ttgggtgctt

10

<210> 59
<211> 10
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<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 59
ttgggtgctc

10

<210> 60
<211> 35
<212> DNA
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<220>
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<400> 60

tatataattt gggcgcttg ggtgcttat atata

35

<210> 61
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 61
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10

<210> 62
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 62
ttgggtgctc

10

<210> 63
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 63
tacgtggcat

10

<210> 64
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
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<400> 64
ggagatgata

10

<210> 65
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 65
ttgggtgctt tgggtgctc

19

<210> 66
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 66
agtaaggttag gagatgata

19

<210> 67
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> ZFP target sequence

<400> 67
tacgtggcat tgggtgctc

19

<210> 68
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger domain

<220>
<221> VARIANT
<222> (13)..(13)
<223> Amino acid 13 is "Xaa" wherein "Xaa" = Z1 wherein Z1 = Arg, Gln,
Thr, Met or Glu

<220>

<221> VARIANT
<222> (15)..(15)
<223> Amino acid 15 is "Xaa" wherein "Xaa" = Z2 wherein Z2 = Ser, Asn, Thr, or Asp

<220>
<221> VARIANT
<222> (16)..(16)
<223> Amino acid 16 is "Xaa" wherein "Xaa" = Z3 wherein Z3 = His, Asn, Ser, or Asp

<220>
<221> VARIANT
<222> (19)..(19)
<223> Amino acid 19 is "Xaa" wherein "Xaa" = Z6 wherein Z6 = Arg, Gln, Thr, Tyr, Leu, or Glu

<400> 68

Gln His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa
1 5 10 15

Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 69
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Zinc finger domain

<220>
<221> VARIANT
<222> (13)..(13)
<223> Amino acid 13 is "Xaa" wherein "Xaa" = Z1 wherein Z1 = Arg, Gln, Thr, Met, or Glu

<220>
<221> VARIANT
<222> (15)..(15)
<223> Amino acid 15 is "Xaa" wherein "Xaa" = Z2 wherein Z2 = Ser, Asn, Thr, or Asp.

<220>
<221> VARIANT
<222> (16)..(16)
<223> Amino acid 16 is "Xaa" wherein "Xaa" = Z3 wherein Z3 = His, Asn, Ser, or Asp

<220>

<221> VARIANT

<222> (19)..(19)

<223> Amino acid 19 is "Xaa" wherein "Xaa" = Z6 wherein Z6 = Arg, Gln, Thr, Tyr, Leu, or Glu.

<400> 69

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa
1 5 10 15

Leu Ser Xaa His Gln Arg Thr His Thr Gly Glu Lys
20 25